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Chlorinated solvent plumes continue to pose challenge. Enhanced reductive dechlorination (ERD) by donor addition and bioaugmentation constitute a potential sustainable technology. A novel technology combining ERD with liquid activated carbon (LAC) amendment has the potential to introduce a bioactive zone with increased degradation. Documentation and quantification of biodegradation is challenged by the combined sorption and degradation. At a TCE plume undergoing LAC amended bioremediation, compound specific isotope analysis (CSIA) for documentation and rate determination, and molecular biology tools (MBT) for determination of specific chloroethenes degraders and their genes are applied to water and sediment. A laboratory treatability experiment is carried out to support the field data evaluation. The challenges in evaluation of the new remediation technology and in applying CSIA and MBT and the lessons learned will be discussed. The attendees will benefit by research insights in the new technology and CSIA and MBT assessment.